REMARKS/ARGUMENTS

Claims 1-11 and new Claims 12-19 are active in the case. Reconsideration is respectfully requested.

The present invention relates to a polyvinyl acetal material and its use in various applications.

Claim Amendments

Claims 1 and 5-11 have been amended in order to make minor corrections of language therein. None of the amendments are believed to have introduced new matter into the claims.

New Claims 12-15 are presented for consideration. Support for the new claims is found on pages 12-15 of the text. Support for new Claims 16 to 18 is found on page 33 of the text. New Claim 19 is a combination of amended Claim 1 and Claim 4. Entry of the amendments and new claims into the record is respectfully requested.

Invention

The present invention is directed to a polyvinyl acetal that has a degree of acetalization that ranges from 45 to 80 mol %. The polyvinyl acetal is obtained by the acetalization of a polyvinyl alcohol that contains from 1 to 15 mol % of α-olefin units and has a 1,2-glycol bond content ranging from 1 to 3 mol %, a degree of polymerization ranging from 100 to 2000 and a degree of hydrolysis ranging from 80.0 to 99.99 mol % with an aliphatic aldehyde or benzaldehyde.

The invention is also directed to aspects in which the polyvinyl acetal is employed as an interlayer film, a binder material and a thermally-developable photographic material.

Claim Rejection, 35 USC 103

Claims 1-11 stand rejected based on 35 USC 103(a) as obvious over Fujiwara et al, U. S. Patent 6,472,470 alone and further in combination with Sharkey, U. S. Patent 2,396,209. This ground of rejection is respectfully traversed.

The Fujiwara et al patent discloses a polyvinyl alcohol material that is useful in a variety of applications as described in column 14, lines 8-35, which uses include a film and in binders that are used in paints and ceramics. Although the reference describes a polyvinyl alcohol material that has a stated 1,2-glycol content of 1.2 to 2.0, a polymerization degree of 200 to 2000, an ethylene unit content of 2 to 19 mole % and a degree of hydrolysis of 80 to 99.99 mol %, there is absolutely no teaching or suggestion in the reference of an acetalization of the polyvinyl alcohol product disclosed with the likes of an aliphatic aldehyde, such as butyraldehyde or benzaldehyde, to achieve a degree of acetalization ranging from 45 to 80 mol %, especially in the context of preparing an acetalized product that exhibits a very well balanced hydrophilicity and hydrophobicity, a good degree of water-proofness and a good compatibility with plasticizers. (It is further noted that the reference does not teach the acetalization of a PVA with the specific aldehydes mentioned in the present claims, but rather acetalization only with an aldehyde that contains a carboxylic acid group.) Indeed, the Examiner acknowledges this in the last several lines on page 3 of the outstanding Office Action.

In fact, the gist of the present invention is that the acetalization of the specific PVA described at length in the text of the specification is conducted with aldehydes as described on page 33 of the text to the extent that the degree of acetalization achieved ranges from 45 to 80 mol %. In order to understand the significance of the acetalization that occurs in the invention, applicants refer to the comparative evidence provided in Tables 19 and 20 of the specification. Table 19 presents the specifics of 14 examples within the scope of the present

invention of PVA acetalized with butylaldehyde (Example 12 is based on a PVA acetalized with propionaldehyde.). All examples are within the defined range of the degree of acetalization set forth in the present claims as shown in Table 13 of the text. Table 20 presents the specifics of 9 comparative examples where samples of PVA were acetalized with butylaldehyde as shown in Table 14, all examples being within the defined range of the degree of acetalization set forth in the present claims except for Comp. Example 9. (Tables 7 and 9 of the text should be consulted as to the specifics of the samples of PVA used in the preparation of the acetalized PVAs of Table 19. Tables 8 and 10 of the text should be consulted as to the specifics of the samples of PVA used in the preparation of the acetalized PVAs of Table 20.) A consideration of the data in Tables 19 and 20 shows the consistently superior equilibrium water content and water absorption percentages (lower values) of the fourteen examples of acetalized PVAs of the present invention over the nine examples of comparative acetalized PVAs. The two tables also show the substantially superior compatibility of the acetalized PVAs with plasticizer of the present invention in comparison to the notably inferior compatibility of the acetalized comparative PVAs with plasticizer.

For further consideration of the uniqueness of the acetalized PVA of the present invention, applicants also refer to Example 15 of the text and the data obtained in Tables 21 and 22. (In the tests of Example 15, a film of acetalized PVA is laminated between two glass sheets and the edge whitening and pan mill values of the laminated plates were determined.) Table 21 shows that for the same acetalized PVA materials of Table 19, excellent ratings for edge whitening and adhesiveness (pan mill values) were obtained. Table 22 shows that for the same acetalized comparative PVA materials of Table 20, inferior ratings for edge whitening and adhesiveness (pan mill values) in comparison to the samples within the scope of the present invention were obtained. Accordingly, applicants submit that the results obtained demonstrate the unobviousness of the acetalized PVA of the present invention over

other acetalized PVAs outside the scope of the present invention. Clearly, the Fujiwara et al patent would in no manner motivate the skilled artisan to arrive at the present invention as claimed and withdrawal of the rejection is respectfully requested.

Applicants submit that the deficiencies of the Fujiwara et al patent are neither overcome nor improved by Sharkey. Sharkey represents well established technology that alcohols can be acetalized by aldehydes such as butyraldehyde or ketonized. In the case of the Sharkey patent, the alcoholic substrate is ethylene/vinyl alcohol copolymers, and the resulting product is acetalized or ketonized copolymer. However, the mere fact that PVA and PVA copolymers can be reacted with either an aldehyde or ketone does not provide the skilled artisan with the motivation to expect that when the specific PVA material of Fujiwara et al is acetalized with the specific aldehydes mentioned to the extent of a degree of acetalization of 45 to 80 mol %, that a superior product is obtained with respect to several important properties. Accordingly, the outstanding obviousness ground of rejection is believed overcome and withdrawal of the rejection is respectfully requested.

As to new Claim 19, not only is the claim distinguished over Fujiwara et al on the basis of the degree of acetalization of the polyvinyl acetal, but in addition the reference neither shows nor suggests the limitation of original Claim 4 which provides a basis for new Claim 19. Accordingly, the new claim is clearly patentable over the combined references.

It is now believed that the application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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